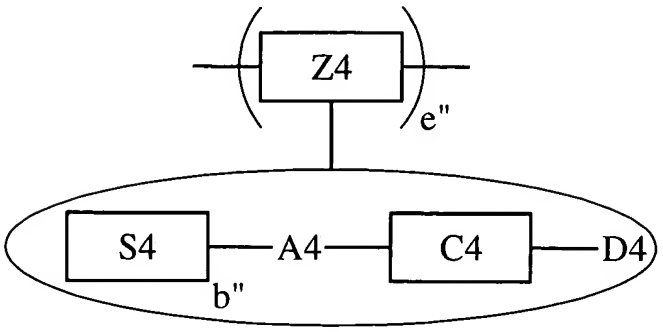
WE CLAIM:

1. A compound having formula (4)



(4)

wherein:

D4 is an electron donor moiety;

C4 is a conjugated bridging moiety;

A4 is an electron acceptor moiety;

S4 is a hydrocarbon, a heterocyclic moiety, or a hetero-acyclic moiety;

b" is an integer;

Z4 is a polymerizable moiety; and

e" is the degree of polymerization.

2. The compound of claim 1, wherein D4 is selected from the group consisting of:

(a) an atom selected from the group consisting of N, O, S, P, Cl, Br, and I where the valence of the atom is satisfied by bonding with C4 and optionally with Z4;

(b) an atom selected from the group consisting of N, O, S, and P bonded to C4, and optionally with Z4, where the atom also is bonded to at least one other moiety to satisfy the valence of the atom;

(c) ferrocenyl;

(d) azulenyl; and

(e) at least one aromatic heterocyclic ring.

3. The compound of claim 1, wherein C4 is selected from the group consisting of:

(a) at least one aromatic ring;

(b) at least one aromatic ring conjugated through one or more ethenyl or ethynyl bonds; and
(c) fused aromatic rings.

4. The compound of claim 1, wherein A4 is selected from the group consisting of:
(a) a carbonyl group;
(b) a carboxyl group;
(c) a sulphone;
(d) an alkene; and
(e) an imine group.

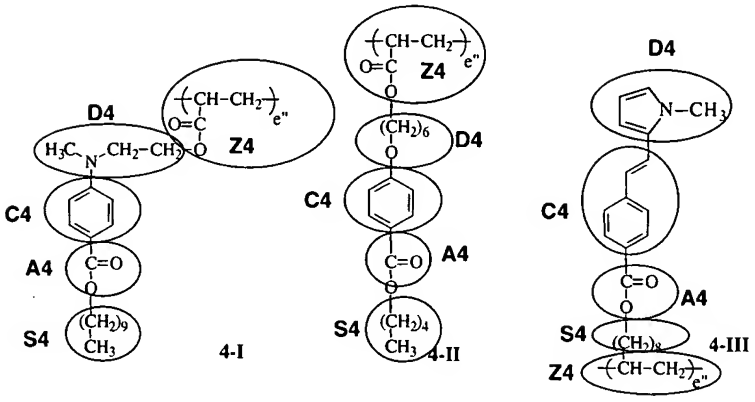
5. The compound of claim 1, wherein the hydrocarbon of S4 is selected from the group consisting of:
(a) a straight chain alkyl group;
(b) a branched alkyl group;
(c) at least one cycloalkyl group, optionally substituted with an alkyl group, an arylalkyl group, an alkylaryl group, a cycloalkyl group, or an alkylcycloalkyl group; and
(d) an arylalkyl group or an alkylaryl group.

6. The compound of claim 1, wherein S4 includes a liquid crystal moiety.

7. The compound of claim 1, wherein Z4 is selected from the group consisting of:
H_2C=CH–C(O)-O- (acryl),
H_2C=C(CH_3)–C(O)-O- (methacryl),
H_2C=C(C_2H_5)–C(O)O- (ethacryl),
-CH=CH_2 (vinyl), and
-C(CH_3)=CH_2.

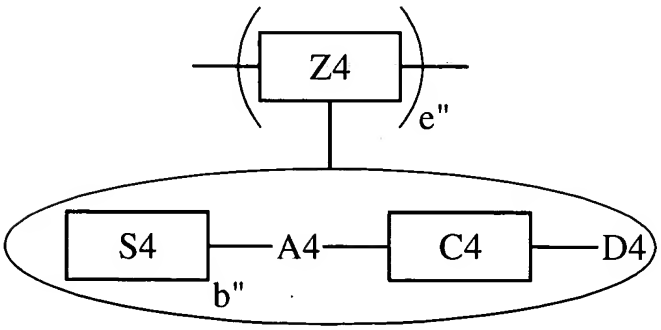
8. The compound of claim 1, wherein Z4 includes a substitution with a moiety selected from the group consisting of:
(a) an alkyl chain; and
(b) a substituted alkyl chain selected from the group consisting of: an alkoxy, a halide substituted alkyl group, and an amino-alkyl group.

9. The compound of claim 1, wherein the compound of formula (4) is selected from the group consisting of:



wherein S4, A4, C4, D4, and Z4 are indicated.

10. A composition comprised of a liquid crystal and a compound having formula (4)



(4)

wherein:

D4 is an electron donor moiety;

C4 is a conjugated bridging moiety;

A4 is an electron acceptor moiety;

S4 is a liquid crystal compatibilizing moiety;

b" is an integer;

Z4 is a polymerizable moiety; and

e" is the degree of polymerization.

11. The composition of claim 10, wherein D4 is selected from the group consisting of:

(a) an atom selected from the group consisting of N, O, S, P, Cl, Br, and I where the valence of the atom is satisfied by bonding with C4 and optionally with Z4;

(b) an atom selected from the group consisting of N, O, S, and P bonded to C4, and optionally with Z4, where the atom also is bonded to at least one other moiety to satisfy the valence of the atom;

(c) ferrocenyl;

(d) azulenyl; and

(e) at least one aromatic heterocyclic ring.

12. The composition of claim 10, wherein C4 is selected from the group consisting of:

(a) at least one aromatic ring;

(b) at least one aromatic ring conjugated through one or more ethenyl or ethynyl bonds; and

(c) fused aromatic rings.

13. The composition of claim 10, wherein A4 is selected from the group consisting of:

(a) a carbonyl group;

(b) a carboxyl group;

(c) a sulphone;

(d) an alkene; and

(e) an imine group.

14. The composition of claim 10, wherein S4 is a hydrocarbon selected from the group consisting of:

(a) a straight chain alkyl group;

(b) a branched alkyl group;

(c) at least one cycloalkyl group, optionally substituted with an alkyl group, an arylalkyl group, an alkylaryl group, a cycloalkyl group, or an alkylcycloalkyl group; and

(d) an arylalkyl group or an alkylaryl group.

15. The composition of claim 10, wherein S4 includes a liquid crystal moiety.

16. The composition of claim 10, wherein Z4 is selected from the group consisting of:

H_2C=CH–C(O)-O- (acryl),

H_2C=C(CH_3)–C(O)-O- (methacryl),

H_2C=C(C_2H_5)–C(O)O- (ethacryl),

-CH=CH_2 (vinyl), and

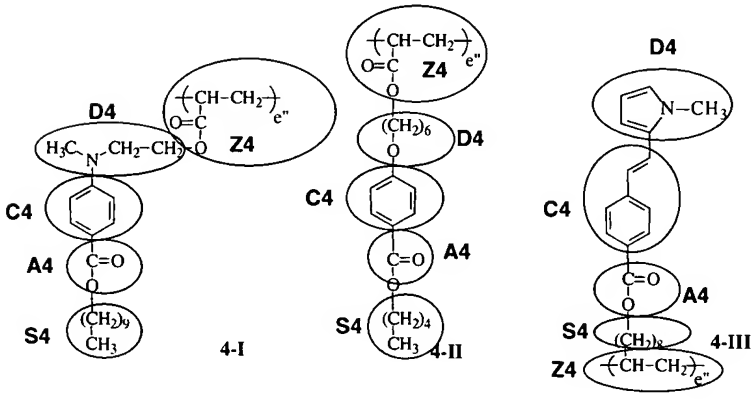
-C(CH_3)=CH_2.

17. The composition of claim 10, wherein Z4 includes a substitution with a moiety selected from the group consisting of:

(a) an alkyl chain; and

(b) a substituted alkyl chain selected from the group consisting of: an alkoxy, a halide substituted alkyl group, and an amino-alkyl group.

18. The composition of claim 10, wherein the compound of formula (4) is selected from the group consisting of:



wherein S4, A4, C4, D4, and Z4 are indicated.